

SUBTERRANEA BRITANNICA

Bulletin No. 8

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Compiled and typed by S. P. Beamon.

EDITORIAL

The continued development of the Federation should be a source of pride to the member societies, and as this edition of the Bulletin shows, our interests continue to be wide both in time and space. We welcome new contributors and new studies of underground structures.

The International Symposium in Cambridge in July is undoubtedly our most ambitious undertaking so far and we look forward to welcoming our French, German and Dutch colleagues. The Committee hope that as many of you as possible will be able to come to it.

JOHN ALEXANDER.

SUMMARY OF THE JANUARY DAY CONFERENCE

The January Day Conference of Subterranea Britannica (Cambs. & Herts.) was held at Lucy Cavendish College, Cambridge on January 28th 1978.

After coffee, Dr. C. L. Forbes, Curator of the Sidgwick Museum, and University Lecturer in Geology, Cambridge University spoke on Tunnelling, Mining and the Water Table. His speciality is water supply from chalk wells, which he illustrated with examples from the Cambridge area, especially those of the Cambridge Water Company built between 1883 and the 1960s.

Dr. Forbes was followed by Dr. C. G. Down of the Department of Mineral Resources Engineering, Royal School of Mines, Imperial College, London, who spoke on Aspects of Underground Stone Mining in Britain. He outlined the historical reasons for underground mining of stone, the economic balance between opencast and subterranean extraction which was pushed in favour of the former by the invention of the steam shovel at the end of the last century. Owing to environmental pressures, however, underground mining is poised to make a comeback. Dr. Down illustrated his talk with a set of slides showing the Plumstead Chalk Mines in 1947, just before they were filled in. A number of slides of the Bath Stone Mines in use as mines and as factories etc. showed the extent and scope of this type of subterranean activity.

After lunch, the session commenced with a short report from Mrs. S. Beamon on the forthcoming International Symposium to be held between the 13 - 16th July. The first paper of the afternoon was from Mr. Frank Morgan, who outlined the strange history of what must be one of the most unusual subterranean habitations ever - The Lime Houses of Buxton, Derbyshire. These were houses burrowed out of the waste left over from lime-burning, which were occupied by the workers in the lime industry. The speaker appealed for anyone interested in excavating one, for there are still the remains of a few.

Brief communications came from Miss M. J. Mahony of the Nottingham Historical Arts Society, who spoke of Subterranean Nottingham and Mr. Paul Sowan, who gave a short discourse on The Surrey Stone Mines, which although they number perhaps 50, have only one plan actually extant.

NIGEL PENNICK.

SOME ASPECTS OF STONE MINING IN BRITAIN

This paper reviews the broad development of stone mining in Britain, primarily from technical and economic point of view, and makes certain predictions for the future.

The most basic question facing a miner in former centuries - and, indeed, the question which still takes priority today - is whether a particular stone bed is better worked by surface quarrying or underground mining. This decision depends upon several factors, notably the geometry of the stone (its position in the ground), the value of the stone when produced and the amount of waste material which has to be removed before access is gained to the stone. In principle, the higher the value of the mineral, the more expensive the mining method that can be afforded, and, in our case, the more waste can be removed. The ratio of the quantity of waste to that of mineral is known as the "stripping ratio".

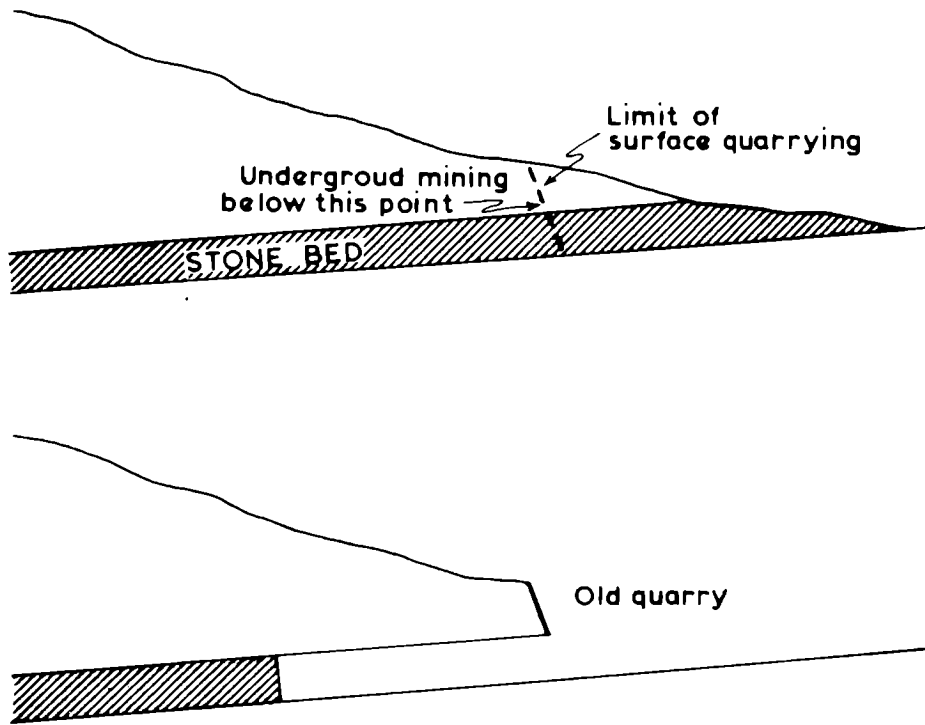
However, the old miner had one great disadvantage in making his choice: working entirely by hand, it took him virtually as much time and effort to dig waste as to dig valuable stone. Consequently if the stone was overlain by more than small quantities of overburden, the old miner would always opt for underground mining in preference to surface quarrying. This partly explains why we can find today so few large quarries dating from those times, but so many extensive underground mines.

This picture remained essentially true until the 1880 - 1890 period, when the first steam shovels were introduced into Britain - initially for work on railway construction and very quickly for quarries. Mechanisation dramatically altered the economic picture, for it then became very much simpler (and cheaper) to work by surface rather than underground methods. An additional factor was the development of a national railway network which permitted cheaply quarried products to compete with expensively mined ones, even after a considerable transport cost. Thus, within very few decades, underground stone mining almost died out in Britain except in rather special cases - slate mining in North Wales, Bath stone, and limited limestone mining in Scotland - where extremes of geology meant that there was no alternative to going underground.

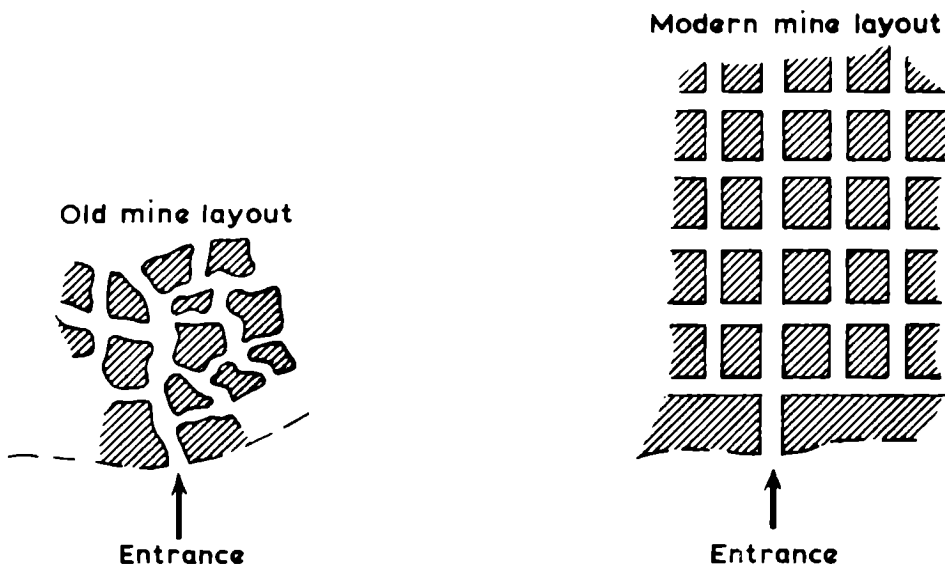
Today therefore there are very few underground stone mines, and those that do survive usually do so because they mine a specialised product which commands a premium price. Examples include Monks Park (Bath stone) mine in Wiltshire, a couple of slate mines in Wales, limestone mines in Scotland, and a major limestone mine at Middleton in Derbyshire.

There are however, some slight signs that underground mining may resume on a significant scale, and to serve the highly competitive crushed-rock market rather than a more leisured and highly-priced sector. This is due to the recent upsurge of environmental concern: surface quarries, no matter how well designed and operated, cause some degree of nuisance, which is almost entirely avoided in underground working. Such a transition from surface to underground would please many planning authorities, especially in National Parks, although many serious practical difficulties stand in the way.

If I am correct in this prophesy, it is certain that a future stone mine will bear no relationship to those past. The old miners had to learn by trial and error the dimensions of the rooms and pillars required to achieve a compromise between safety and economic operation (most mines were room and pillar), but these dimensions were usually fairly small. For soft rocks, such as chalk, maximum room width was 8 - 12 ft. (2.4 m. - 3.6 m. approx.) in most cases, with pillars around 16 x 16 ft. (4.8 m. by 4.8 m.) up to about 20 x 30 ft. (6 m. by 9 m.). Such dimensions are characteristic of the major room and pillar mines at Alliance Road (Plumstead), Chislehurst and Federation Road



Sections through old surface quarry and underground mine



Plan views of old and modern mines

Some Aspects of Stone Mining in Britain (Cont'd)

(Woolwich) mines in South-East London. The Blackheath Caves (Maidstone Hill) also in South London were somewhat larger, comprising irregular chambers as much as 30 ft. (9 m.) wide. However, chalk spans more than about 6 ft. (1.8 m.) are seldom permanent so that the miners used to make the supporting pillars wider at the top than the bottom. This gave the characteristic "truncated arch" section found in so many of these old chalk mines.

Harder rocks such as limestones could support much greater spans - up to 40 ft. (12 m.) or more in some cases - but all these mines, whether soft or hard rock, show a very irregular layout of rooms and pillars at first, with later work tending to be more on a geometric grid or checkerboard layout as the benefits of the latter were discovered.

Today we have the ability to predict, with some degree of confidence, all parameters of mine design before ever starting to mine, so that irregular work should not recur. Openings will have to be larger, to permit access by machinery, and the water table will no longer be the problem that it was to the "old men".

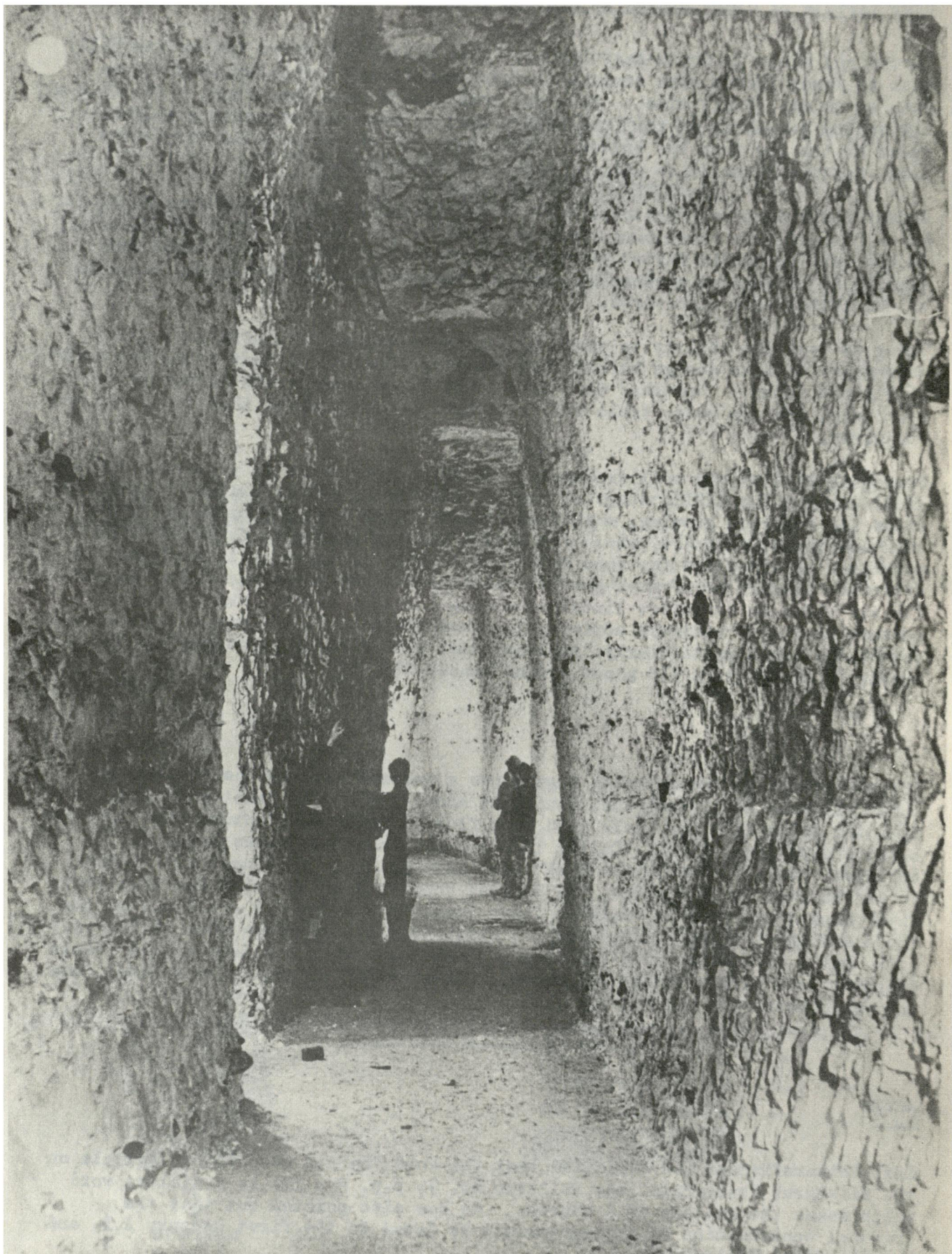
Something else we may well incorporate in any future mines is provision for an after-use once the mining stage is over. Already we use in Britain several old mines for mushroom growing, munitions storage, high-security space (e.g. for computer tapes, fine art, etc.) and even a light engineering factory. Old mines can be excellent for such uses, but clearly if the mine is designed for after-use it will be of much greater value. This is already realized in the U.S.A., where an extensive limestone mining industry exists, and where an immense amount of business activity is concentrated in old mines. Deep-freeze warehouses are a particularly important use, with a large percentage of the country's capacity in old mines around Kansas City.

C. G. DOWN.

The photograph on the opposite page shows a general view in the chalk mines under Alliance Road, Woolwich, London in about 1947. At least four mines were operated after 1850 for chalk used as a flux in brick manufacture, the last one being closed about 1914. During 1946 the Alliance Road mines began to collapse, hence the survey in 1947 undertaken prior to filling the workings. As can be seen in this photo, the general condition of the mine was excellent, with rooms 8 ft. (2.4 m.) wide at floor level (3 - 4 ft. (.9 - 1.2 m.) at the roof) and about 20 ft. (6 m.) high. Originally the workings were 15 ft. (4.5 m.) high, but a lower lift of 5 ft. (1.5 m.) was taken when the London water table dropped; the slight "step" in the wall, showing the original floor level, can just be discerned.

NOTE:

Karl Schwarzfischer has explained that the word "Bahre" used in his article on the Eidengrub Souterrain (see Bulletin No. 7, p.p. 8 - 11) is a dialect word which means the gallery of a church. He has also pointed out that the original construction of the souterrain is dated to the first Century A.D. and not the first Millenium.



A PRELIMINARY ACCOUNT OF THE LIME HOUSES OF THE BUXTON AREA - PART II

In Gem of the Peak (5th ed., 1851), by William Adam, we read:

Almost the entire of Grin-low is covered with lime kilns. They gave to this hill originally a strange and uncouth appearance, but the plantations now rapidly getting up, hide the greater part of them. The hill is composed of a bluish limestone, admirably adapted for making lime of the very best quality, which is transported to great distances.

In many of the old hillocks, composed of the dross and slag from the kiln, and which are of great extent, some of the peasantry have formed themselves houses, called Lime Houses. Breaking through the outer crust, which becomes exceedingly hard and waterproof, the parties excavate all the interior, wall it up inside, and divide it, make windows, and perforate a hole through the top for the chimney, and by these means obtain a cheap and tolerable dwelling; but it is said not to be healthy. Several of these we passed, on descending through the plantation.

An account of a change in the situation appears in James Croston's book On Foot Through the Peak (3rd ed., 1876), in which we are told:

A great portion of the summit of Grin Low is covered with dross and slag, the refuse of the neighbouring limekilns. Many of these nine hillocks have been excavated, and were formerly the habitations of human beings - generally a small aperture in the side answered the purpose of a window, and an opening through the roof served to carry off the smoke from the interior. Through the exertions of the late Mr. Wilmot, the agent of the Duke of Devonshire, these wretched hovels have been destroyed, and in their stead a number of neat and comfortable dwellings have been erected at Burbage, a hamlet close by, for the poor lime-burners who formerly located here. The former unsightly heaps are now covered by a thriving plantation of firs which adds to the interest of the surrounding landscape.

However, as late as 1928, in Buxton Old and New, by J. A. Goodacre, we find the statement, "A fair specimen of these tenements still exists above the top of Duke Street, Burbage. They were formed out of masses of lime refuse." - so that there is reason to suppose that Mr. Wilmot's improvements on the Duke's behalf did not succeed in destroying all trace of these dwellings. Nellie Kirkham, an erudite and reliable recorder of Peak District local history, writing in 1947, stated that at least one man was then alive - aged 70 - who had been brought up in one of these homes.

An interesting indication that this type of home was not confined to the immediate vicinity of Grin Low and Burbage is to be found in the July 1863 issue of the Burbage Magazine, where we may read:

A very sad accident occurred on Friday last at Dove Holes by the falling of a room cut out of a heap of lime ashes by which two women and two children lost their lives. We should be very thankful we have no such accident to note in Burbage where lime huts used to be all too common.

Dove Holes is another limestone quarrying village about three miles north of Buxton. Recent "landscaping" of the unsightly lime-waste heaps at Dove Holes is likely to have destroyed any trace that may have remained of lime houses in that area.



A Buxton Lime Worker's Cottage, 18th Century. Copied from an engraving and published by Bates Bros.

Existing Material Remains

The ruins of several former lime houses may still be seen in the Burbage/Ladmanlow area. The best preserved stands at G.R. SK 042726, in a field behind No. 37, Old Macclesfield Road, Burbage, the home of Mr. E. Willmott, who states that this structure was used by an old man in the village who kept a cow in it until about twenty years ago and that it was later used as a chicken house, and began to collapse only after the door was removed ten years ago. It is cut out of a rounded waste heap about 10 ft. (3 m.) in height. The roof has fallen in around the entrance but the interior takes the form of a rectangular room, at present 7' x 14' x 5'6" (2.1 x 4.2 x 1.7 m.). There is an opening in the left-hand (eastern) wall which may represent a former window hole. The floor is covered to an unknown depth with debris from the weathering of the roof and walls, and miscellaneous rubbish. Two other, much more ruinous examples stand nearby. A long-ago demolished public house used to use one of them, according to Mr. Willmott, for storage purposes. Several similar features have been destroyed in the vicinity within the memory of people still living in Burbage.

A further example may be seen on the southern slope of Grin Low, facing the Ladmanlow-Harpur Hill road at SK 046717. The remains of two rooms are apparent but their original shape and size cannot be determined. Elsewhere on the same hillside there are several mounds of lime waste which show a crater-like central

A Preliminary Account of the Lime Houses of the Buxton Area - Part II (Cont'd)

depression, the wall of which is broken through on the downhill side. Some of these features may well represent demolished or completely collapsed lime houses, though others may be the remains of lime kilns. A little further along the same road, at SK 056713, just over the wall on the southern side of the road, is a well preserved example of the old open-bowl type of lime kiln. The bowl is lined with gritstone and is at present partly filled with rubbish but is otherwise intact. In the mass of waste below this kiln, which has dammed a brook and formed a small lake, is a feature which could conceivably be the remains of a lime house but, to judge by its situation, may more likely have served merely as a shelter for the workers at the kiln.

A few examples in the same tradition, though probably not as old as those nearer Buxton, are to be found between Peak Forest and Sparrowpit, near the A623 road, about five miles (8 km.) north-east of Buxton. In an area now entirely agricultural, there were carried on in past times lead mining, lime burning and the re-working of mine waste to recover fluorspar. In the mixed waste heaps resulting from these activities are to be found several chambers, the best preserved at SK 102796, being rectangular, about 10' x 14' (3 m. x 4.2 m.) in size, with 5' 6" (1.7 m.) of headroom still in places. There are other, collapsed chambers in the same waste heap and a short distance away one may discern, on lying flat and peering into a hole blocked with barbed wire, some dry-stone masonry which could be the remains of a fireplace and chimney. Near to Sparrowpit, on the northern side of the road, is a conspicuous chambered mound in which two massive timber doorposts are buried to within two feet of their lintel in the material which has fallen from roof and walls. It was something of a disappointment to learn from Mr. G. Vernon, of Sparrowpit, who farms the land on which it stands, that he helped his father to construct it as a place to keep hens in, in 1948 or thereabouts. Perhaps we should regard this as the last instance we are likely to encounter of the employment of an ancient tradition of the locality.

Having looked into this subject from a distance, spending very little time investigating it in the Buxton area, it seems to me likely that, if anyone living there should be moved to carry the investigation a step or two further forward, there should be other records available locally which I have not seen, more personal recollections to be recorded and also the opportunity, under the direction of someone with practical experience of archaeological excavation, to search for further evidence by digging at one or more of the sites. The fact that the floors of these dwellings must have received a steady increment of debris falling from the roof and walls suggests that there is a good chance of finding small objects which became accidentally buried during the period of occupation. Subterranea Britannica would welcome any comments, corrections, amplifications, informative notes or more substantial accounts on this topic, for publication.

FRANK MORGAN.

Erratum

In Part I, first line of the section "Contemporary Descriptions", for "Faugas" read "Faujas". The complete reference to the source consulted is: A Journey Through England and Scotland to the Hebrides in 1784. A revised edition of the English translation + edited with notes and a memoir of the author by Sir A. Geikie. 2 Vols., Glasgow, 1907.

* Translation of Voyage en Angleterre, en Écosse et aux Îles Hebrides ...
B. Faujas de Saint-Fond, Paris, 1797.

CAVES AND THE USES TO WHICH THEY WERE PUT IN NOTTINGHAM

The Nottingham Historical Arts Society was formed eleven years ago so as to explore and record cave systems which were threatened by building applications in the southern area of the city centre.

The fascination which caves have for many of us was demonstrated by the steady trickle of new recruits who joined the group over the years. The demolition of property in the Drury Hill area revealed an enormous number of caves hewn by man out of the Bunter sandstone and this gives rise to the inevitable questions: Why did they carve these holes in the rock? Undoubtedly the labour was strenuous, and having done so, to what uses were they put?

After our years of work and research, we virtually dismiss the idea that they were used as dwellings, except perhaps as shelters for vagrants in small disused caves in the cliff face, or where a house has been built against the cliff and at a later date enlarged by burrowing into the cliff. The famous Inn, "The Trip to Jerusalem", is an extant example of this technique. We also know of public houses which claim to have 'cock pits' in their cellars.

To their certain use for industrial purposes I submit the following selections:

1. The Tanning industry - Rock cut vats under the Broad Marsh shopping precinct not only give archaeological evidence for this industry, but Borough records add documentary evidence that the caves in this area were so used. These caves are now open to the public, but unfortunately many others in this area were lost under the re-development.
2. The Fishing industry - Caves cut into the rock on Fisher Gate may possibly have been used for storage of fish. It is known that the river Lene divided into several channels and flues in this area. Some of these caves still exist, but have had their entrances bricked up by the Corporation for safety.
3. Wool Storage - We know that wealthy wool merchants lived in houses with caves beneath them. Vault Lane, which was later re-named Drury Hill, is one area where this occurred. Fine Venetian glass, a bronze seal and much good quality medieval pottery was found in some of these caves, now lost.
4. Sand Mining - An underground quarry to the west of the Mansfield Road was being worked at a time when the fields above were still common land. We know that the thrifty Nottingham housewives would buy a penn'orth of sand to spread on the floors instead of rushes, and it doubtless was a reasonably profitable business.
5. Catacombs - The Rook Cemetery, situated at the top of the hill on the Mansfield Road has a series of tunnels large enough for the proverbial cart and horse to be driven through them. The 19th Century Cemetery Company ran out of money before the project was completed, but the passages are still there, unused, I hasten to add!
6. Brewing and Malting - Development revealed a set of caves in Castle Gate with a malt kiln, and other examples have been observed in various parts of the City.

We are currently working in Bridlesmith Gate and one of the systems there contains what we believe to be an unfinished malt kiln, and adjoining 'rooms' were obviously used for barrel storage. In the 18th Century, part of this system was used by a chemist who occupied the buildings above.

Caves and the Uses to Which They Were Put in Nottingham (Cont'd)

Still on Bridlesmith Gate, but under some other buildings, we are still in the process of emptying caves which have a strong ecclesiastical flavour. An inner doorway connecting two caves has a pointed arch. The central pillar of the main cave is carved out of the living rock, and has a cushion capital from which the roof springs into a flat dome. What is more, the main doorway, which was blocked up until very recently, has a 'George' Cross carved above it on the outside. The doorway has been carefully cut out of the rock, with plain moulding following the line of the opening on its outer face. Unfortunately, this area was much disturbed by development on the adjoining site within the last decade, one where we were not even permitted a watching brief, and most of the fill is obviously attributable to this time, though pits close-by produced some fine examples of 13th Century pottery. These caves will be open to the public when cleared.

I have dealt with the evidence we have for the uses to which the caves were put, but this still leaves unanswered the reason why. It was not shortage of space during the 12th, 13th or 14th Centuries, when Nottingham had many gardens, orchards and other open spaces (and many of these caves were already in existence then). So far, we are at a loss to explain this excessive industry on the part of these early citizens, but I think we owe them a debt of gratitude for the pleasure they give us in rediscovering their efforts.

MAUREEN MAHONY.

Further details of the Nottingham Historical Arts Society are available through their publications (Miss M. Mahony, 3 Littlegreen Road, Woodthorpe, Nottingham)

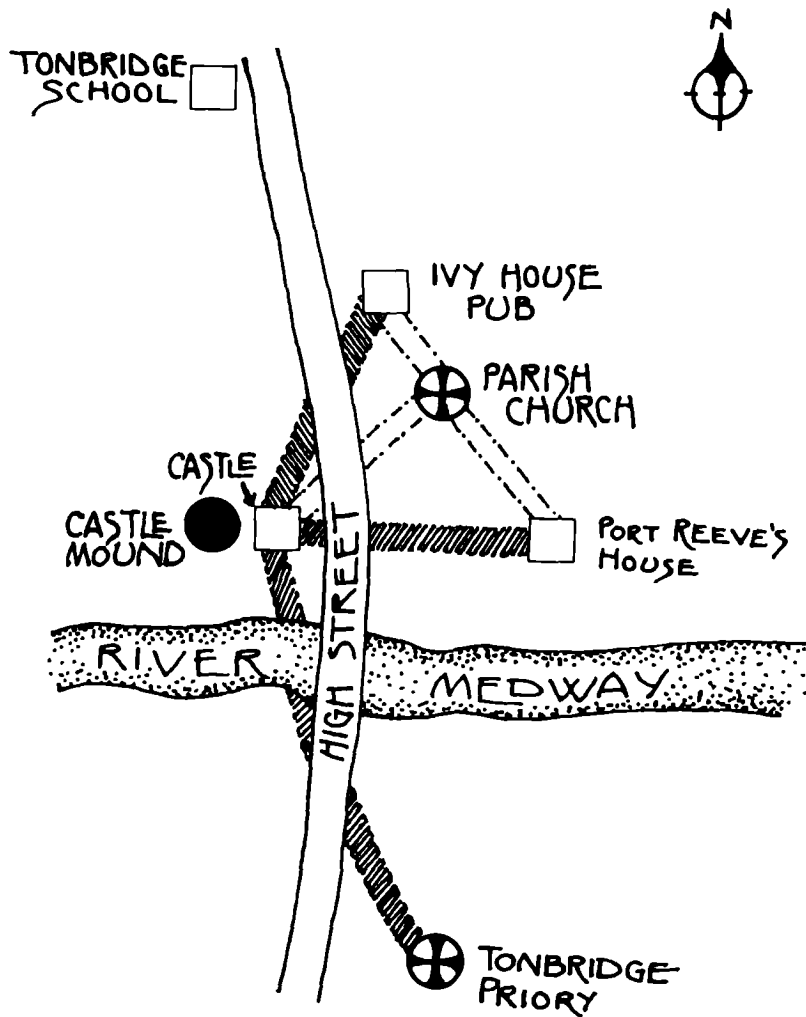
THE UNDERGROUND TUNNEL SYSTEM IN TONBRIDGE, KENT

Tonbridge has an underground tunnel system which I find fascinating, but for the public it is virtually impossible to physically investigate. Most of it has been blocked for many years and the last extant open tunnels beneath the Castle mound were closed in the 1950's when pronounced as 'dangerous' by the local authorities. As a result of this, very few people in the town know of the existence of this tunnel system and the published material is scant. I have taken most of my information from local inhabitants with longstanding knowledge of the town.

The tunnels are all in the same area of the town, occupying some quarter of a square mile and all probably served the Castle. The Castle being built in Norman times, these tunnels must therefore be medieval in date, if they are contemporary with its building. The tunnel underneath the Mound (see plan) poses for us other problems, being possibly pre-Norman in date. The system would seem to have been intended primarily for communication linking important town buildings, the Castle, the Mound, the Parish Church of Saints Peter and Paul, the Priory and the town gatehouses.


TUNNEL NUMBER ONE - is the best known in legend if not in actuality. This connects the outer walls of the Castle with the Priory of St. Mary Magdalene, dissolved in 1539, left to the ravages of time and ultimately destroyed in 1839 by the South Eastern Railway Company when building a new main line. The remains of this tunnel are even more difficult to find because the site of the former priory was tarmac'd over to become the depot of National Carriers Ltd.

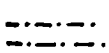
UNDERGROUND TUNNELS OF TONBRIDGE






NP.1978

KEY:

 TUNNELS VERIFIED BY PERSONAL INVESTIGATION, PUBLISHED RECORDS AND LOCAL PEOPLE.

 SUGGESTED TUNNELS, STILL SUBJECT TO PERSONAL INVESTIGATION.

   TUNNEL ENTRANCE OR EXIT. SCALE: 5CM: 1KM.

The Underground Tunnel System in Tonbridge, Kent. (Cont'd.)

However, an 1825 source describes quite categorically that this tunnel ran straight underneath the River Medway to the Priory!

TUNNEL NUMBER TWO - links the Castle with the Ivy House public house. This tunnel has been verified by the former landlord, and a blocked entrance is in the public house cellar itself. There are several blocked entrances also at the Castle walls. This tunnel would have served strategic purposes, as the Ivy House was a former medieval gatehouse. The town was then fortified by a wall and fosse, and the tollgate was supported by several gatehouses.

TUNNEL NUMBER THREE - again links the Castle with another former gatehouse, the Fort Reeves House. This gatehouse was also formerly a public house and the present tenant told me and the local newspaper the Courier, that there is a blocked cellar entrance, where in all probability the tunnel formerly entered.

Other local stories tell of an old legend whereby a local boy entered one of these tunnels searching for treasure. Not uncommonly in these tales he reached a half-way point and ran back to the tunnel entrance in a frightened state, although it is not explained why.

OTHER TUNNELS

The Castle is also linked, allegedly, with the Parish Church of St. Peter and St. Paul and the Ivy House, Parish Church and Port Reeves House are supposedly linked by another tunnel, although this cannot at present be verified, the area having been built upon and constantly altered since the building of the Castle.

The most interesting tunnel for me is that underneath the Castle Mound which was blocked off completely due to falling rubble for supposed 'public safety'. I am at present attempting to gain permission to explore this and hope that a restoration will soon be possible if the money is forthcoming for a public re-opening. There is also a well at the top of the mound, the shaft of which reaches into the tunnel at the bottom. The town also has at least three other underground tunnels besides those that fit into the above system, the Seaboard Staff College has an 18th or 19th Century tunnel leading from the grounds of the house to the lakes. This tunnel used to be lit up and used, but in recent years it has been disused. Another tunnel also existed nearby in Ashes Lane, I last located it some years ago and it no longer seems to be extant.

Somerhill House also has a tunnel leading from a cellar in the house to the wooded grounds and a nearby spring. This tunnel was the scene of a fire some years ago and was partially destroyed.

With the exception of these last examples, it can be suggested therefore, that all the tunnels in the actual central Tonbridge system were established as an interlinking network serving the Castle, which was formerly the centre of power in the town.

ALAN BULLION.

RESIGNATION

Prof. Glyn Daniel has found it necessary to resign from being our Honorary President, particularly as he has become the President of the Royal Anthropological Institute recently, however, sends his good wishes and hopes our organisation will flourish.

CHALK MINES IN NORWICH

The following account of a chalk mine in Norwich was published as a letter in Philosophical Transactions in 1748 (vol. 45, No. 486, pp. 244-247). It was read at a meeting of the Royal Society on March 24th 1747.

"As the inspection and study of nature is the particular province of the Royal Society, and every attempt to improve our knowledge is certain of your favour, I take the liberty to lay before you the substance of a letter from my industrious correspondent and friend Mr. William Arderon, F.R.S. containing the description of a large vault or cavern, extended under several hills near the City of Norwich, with some observations and experiments made by him there.

About a quarter of a mile from the City of Norwich, on the east side thereof, and near the entrance of Moushold Heath, is a large subterraneous cavern, which has been formed in a long series of time, by the digging out of chalk for the making of lime. There's but one entrance into it, whose breadth is about two yards (1.8 m.), and its height nearly the same, however the height gradually rises, till at last it measures in some places from twelve to fourteen yards (10.9 - 12.8 m.). But notwithstanding the entrance is so small, the whole area within is of such large extent, that twenty thousand men might with great ease be plac'd therein, as I believe will scarcely be doubted, when I assure you, that, from the entrance to the furthest part of these darksome cells, measures full four hundred yards (365.7 m.); and that these passages are frequently ten or twelve yards (9.1 m. or 10.9 m.) wide, with branchings out on the sides, into various lanes and labyrinth kind of windings, that every now and then open into one another; which renders it no easy task to find the way out, when a person has been a little bewilder'd in these subterraneous mazes.

Most of these vaults are arched at top, whereby the immense weight, which every moment presses on them, is well supported; a weight no less than that of hills, whose perpendicular altitude above the tops of these arches is twenty or thirty yards (18.2 m. or 27.4 m.), if not much more. I have frequently, says my correspondent, gone into these caverns out of curiosity; but could never perceive the least appearance of those damps which are so common in mines, and other subterraneous places, where the air is stagnant for want of a due current; which should seem to be the very case here, as there is but one entrance into it. The passage indeed is horizontal, and open to the west wind; but the included air's being free from putrefaction, may possibly be owing to the large quantity of salt which the chalk contains.

How deep or thick these rocks of chalk are, no one, so far as I can find, can tell; for, in sinking the lowest wells, they have never, that I know of, been dug thro'; and consequently must be exceeding deep. The chalk at the further end of this cavern is so soft, that it may be moulded with the hand like paste; which I take to be its original consistence, and what it always retains, till it becomes expos'd to the air. In the very lowest parts of these vaults I have picked up several kinds of fossils, figur'd by marine bodies; such as Echini, Pectunculi, common or fluted cockle, Belemnite, etc. and by diligent search, other sorts might perhaps be found. Sounds made beneath these arched roofs are strongly reflected from side to side; so that the least whisper may be heard at a considerable distance. The beat of a pocket watch was heard distinctly full twenty yards (18.2 m.) from where it was placed.

Chalk Mines in Norwich (Cont'd)

I visited this place on the 1st day of November last, in order to try the temperature therein, as to heat and cold; and carried with me a thermometer regulated by one of Mr. Hauksbee's, which I set down at the further end of these caverns; and letting it remain there for some time, I found the mercury rested at 52°. which comparing with the register I had kept, was, I found, within half a degree of a medium betwixt the greatest heat and the sharpest cold we have known in this City for ten years past; and it is very probable, if the two extremes had been taken more exactly, the temperature in these caverns would be found to come yet nearer to the medium of heat and cold in this climate.

	<u>Hauksbee's Therm.</u>
The greatest degree of heat was July 18. 1746	15
The greatest degree of cold was Jan. 9. 1740	<u>88</u>
Which added together make	103
The medium of which is	<u>51½</u>

I find, by inspecting Mr. George Martin's collection, and comparison of the scales and degrees of heat with various thermometers, that the temperature of heat in these caverns coincides with that in the caves at the observatory at Paris, within one degree; which I think comes very near, considering the observations were made with different instruments, and formed upon different principles.

At the foot of a high hill, adjacent to these vaults, issues out a curious spring, whose water I found exactly of the same temperature with that underground; though, when the thermometer was exposed to the open air, it stood at 57°.

Permit me, sir, to subscribe myself, with the utmost truth and respect,

London, March 15.
1747-8

Your most obedient humble Servant,
Henry Baker.

A footnote at the end of the letter adds "A terrible thunder-storm, June 12, 1748, shook the Earth to such a degree as to throw down these chalk vaults".

In about 1823, while a well was being dug, an extensive mine in the chalk was found in Heigham Hill near Norwich. The passages were about eight feet (2.4 m.) high and two to five feet (.6 m. to 1.5 m.) wide and occupied a total length of 4,600 feet (1401.7 m.). It was considered that the mine was for flints which were used to repair the walls of the City around 1571. When unblocking the original entrance the date of 1571 was found along with the name of one of the workmen (Featherstonhaugh, 1827). It is unlikely that these two mines were the same one since their descriptions vary in many ways but chalk, and perhaps flint, mining in Norwich has a long history.

Further research of the literature and, if possible, underground exploration will provide much more information. It is hoped that this small article will encourage further study into the mines of Norwich. The author is particularly interested in information regarding the Merton Road subsidences which occurred in 1935 to 1936. The mines responsible for this subsidence were eventually filled by the local council.

R. P. SHAW.

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REVIEW

CAVES AND CAVING IN BRITAIN by Edmund J. Mason. Robert Hale, London, 1977.
208 p. 38 illus. 6 maps 79 ref. £4.50. ISBN 0 7091 6195 6

As one might expect, this book is, for the most part, of only marginal relevance to the aims of *Subterranea Britannica*, a statement in no way intended to detract from its usefulness to the budding speleologist or from the interest which the general reader may find in it. Although the book deals mainly with natural caves and potholes, our members may find valuable the insight which it presents of the experiences of an archaeologist in the underground environment. We are introduced to the limitations imposed by lack of space and to devices adopted by excavators such as Beard, Boyd Dawkins, Balch and the author himself to circumvent them. While most of the archaeological sites referred to are, essentially, natural cavities utilised by man, those associated with mining (not by any means confined to chapter eleven, "Lead Mines") fall squarely within the field of interest of our Society. The underground canal in the Speedwell Mine, Castleton; the Blue John mines in the same neighbourhood; the association of natural caves with mine workings of considerable antiquity near Matlock Bath and even the lead resmelting flues of Charterhouse, on Mendip, are all of this type. Good monochrome photographs are included which depict various aspects of former mining activity and one, entitled simply "West Chamber, Oxlow Cavern", shows in fact a natural cavity much enlarged by the mining of the vein in which it was formed.

By virtue of his long experience of caving and underground archaeology, Mason has been able to introduce a historical perspective in his treatment and by the intelligent use of old records and the occasional introduction of a telling anecdote (personal or second-hand), has enlivened what might in other hands have been a rather too factual and impersonal account. We may derive from his chapter "Caves in Legend and History" a healthy scepticism with regard to some local traditions, yet from that on Cave Studies a consciousness of the extent to which our own investigations may relate to, complement or even damage the interests of others. He shows us how air and water movements, fauna and flora, fossils and human artefacts may each form the basis of separate scientific studies, yet all may benefit from the assistance of photographers, surveyors and other technical specialists who have a particular interest in underground work. One notices the occasional lapse with regard to clarity of expression, accuracy of punctuation and attention to detail (why, in the fairly full description of Oxlow Cavern, is there no mention of its important connections with Giant's Hole and Maskhill Mine?) but, taken as a whole, the book is informative, factually accurate and eminently readable. A short glossary of technical terms, a list of caving clubs and a useful index are appended.

FRANK MORGAN

